

CLAIMS

What is claimed is:

1. A method to refine a lubricant comprising a compound having a perfluoropolyether structure, the method comprising:
utilizing supercritical extraction by contacting the lubricant with an extracting medium of supercritical carbon dioxide under a predetermined condition in a pressure vessel to remove ionic impurities from the lubricant.
2. The method to refine a lubricant according to claim 1, wherein the predetermined condition is a combination of a temperature and a pressure at which a density of the supercritical carbon dioxide is less than or equal to a density of the supercritical carbon dioxide at a temperature of 60°C and a pressure of 20 MPa.
3. The method to refine a lubricant according to claim 1, wherein the ionic impurities are included in the group consisting of sodium ions, potassium ions, chloride ions, HCO_3 ions, HSO_4 ions, and sulfate ions.
4. A method to refine a lubricant comprising a compound having a perfluoropolyether structure, the method comprising:
using supercritical extraction by contacting the lubricant with an extracting medium of supercritical carbon dioxide under a predetermined condition in a pressure vessel to remove a perfluoropolyether compound having a terminal group of weak polarity from the lubricant.
5. The method to refine a lubricant according to claim 4, wherein the predetermined condition is a combination of a temperature and a pressure at which a density of the supercritical carbon dioxide is less than or equal to a density of the supercritical carbon dioxide at a temperature of 60°C and a pressure of 16 MPa.
6. The method to refine a lubricant according to claim 4, wherein the perfluoropolyether compound having a terminal group of weak polarity is a perfluoropolyether compound having a terminal group included in the group consisting of CF_3^- , CF_2H^- , and CF_2Cl^- .

7. A method to refine a lubricant comprising a compound having a perfluoropolyether structure, the method comprising:

utilizing supercritical extraction by

contacting the lubricant with an extracting medium of supercritical carbon dioxide under a first condition in a pressure vessel to remove a perfluoropolyether compound having a terminal group of weak polarity from the lubricant, and

contacting the lubricant from which a perfluoropolyether compound having a terminal group of weak polarity is removed with an extracting medium of supercritical carbon dioxide under a second condition to remove ionic impurities from the lubricant and to extract and recover the perfluoropolyether lubricant.

8. The method to refine a lubricant according to claim 7, wherein

the first condition is a combination of a temperature and a pressure at which a density of the supercritical carbon dioxide is less than or equal to a first density of the supercritical carbon dioxide at a temperature of 60°C and a pressure of 16 Mpa; and

the second condition is a combination of a temperature and a pressure at which a density of the supercritical carbon dioxide is less than or equal to a second density at a temperature of 60°C and a pressure of 20 MPa.

9. The method to refine a lubricant according to claim 7, wherein the perfluoropolyether compound having a terminal group of weak polarity has a terminal group included in the group consisting of CF_3^- , CF_2H^- , and CF_2Cl^- , and the ionic impurities are included in the group consisting of sodium ions, potassium ions, chloride ions, HCO_3^- ions, HSO_4^- ions, and sulfate ions.

10. A perfluoropolyether lubricant refined by utilizing supercritical extraction, wherein the lubricant contacts an extracting medium of supercritical carbon dioxide under a predetermined condition in a pressure vessel to remove ionic impurities from the lubricant.

11. A perfluoropolyether lubricant refined by using supercritical extraction, wherein the lubricant contacts an extracting medium of supercritical carbon dioxide under a predetermined condition in a pressure vessel to remove a perfluoropolyether compound having a terminal group of weak polarity from the lubricant.

12. A perfluoropolyether lubricant refined by utilizing supercritical extraction by contacting the lubricant with an extracting medium of supercritical carbon dioxide under a first condition in a pressure vessel to remove a perfluoropolyether compound having a terminal group of weak polarity from the lubricant, and

contacting the lubricant from which a perfluoropolyether compound having a terminal group of weak polarity is removed with an extracting medium of supercritical carbon dioxide under a second condition to remove ionic impurities from the lubricant and to extract and recover the perfluoropolyether lubricant.

13. A magnetic recording medium comprising:

a nonmagnetic substrate,

a plurality of layers sequentially laminated on the substrate, the layers including at least

a nonmagnetic underlayer;

a magnetic layer, and

a protective layer; and

a lubricant layer, applied to the protective layer, wherein the lubricant layer substantially comprises a perfluoropolyether lubricant refined by utilizing supercritical extraction by contacting the lubricant with an extracting medium of supercritical carbon dioxide under a predetermined condition in a pressure vessel to remove ionic impurities from the lubricant.

14. A magnetic recording medium comprising:

a nonmagnetic substrate;

a plurality of layers sequentially laminated on the substrate, the layers including at least

a nonmagnetic underlayer,

a magnetic layer, and

a protective layer; and

a lubricant layer, applied to the protective layer, wherein the lubricant layer substantially comprises a perfluoropolyether lubricant refined by utilizing supercritical extraction by contacting the lubricant with an extracting medium of supercritical carbon dioxide under a first condition in a pressure vessel to remove a perfluoropolyether compound having a terminal group of weak polarity from the lubricant, and contacting a lubricant from which a perfluoropolyether compound having a terminal group of weak polarity is removed with an extracting medium of supercritical

carbon dioxide under a second condition to remove ionic impurities from the lubricant and to extract and recover the perfluoropolyether lubricant.

15. A magnetic recording medium comprising:

a nonmagnetic substrate;

a plurality of layers sequentially laminated on the substrate, the layers including at least

a nonmagnetic underlayer,

a magnetic layer; and

a protective layer; and

a lubricant layer, applied to the protective layer, wherein the lubricant layer substantially comprises a perfluoropolyether lubricant refined by using supercritical extraction by contacting the lubricant with an extracting medium of supercritical carbon dioxide under a predetermined condition in a pressure vessel to remove a perfluoropolyether compound having a terminal group of weak polarity from the lubricant.